ON TWO NEW SPECIES OF *CASUARINA*.

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(Plates xlvi.-xlvii.)

Casuarina Cambagei, sp.nov.—"Belah."

(Plate xlvi.)

A tree attaining a height of from 70 to 100 feet, dioecious, glabrous; branchlets glaucous or dark green in the slender form, ascending, internodes varying in length up to half an inch; not prominently angled.

Whorls 9-10-merous, the sheath-teeth acute.

Male spikes at the ends of the branchlets, in the slender variety from 1 to 2 inches long, in the glaucous variety usually 1 inch long; sheathing teeth erect.

Cones cylindrical, about 12 to 14 lines long and 10-12 broad, truncate; valves obtuse, very prominent, glabrous or minutely hoary pubescent on the exposed dorsal half, with a dorsal prominence or thickening. Nuts pale-coloured, 3 lines long including samara.

Hab.—Mount Hope, Forbes, Bogan River Country, Condobolin, Nymagee (*R. H. Cambage*); Bourke to Barringun (*R. Ridge*). In fact it occurs from the Queensland to the Victorian borders between the Darling River and the main Dividing Range.

"Belah" has a very wide range in the interior of this Colony, and has possibly in the past been confounded with *C. glauca*, Sieb.; and there can be little doubt but that Bentham has included it under his description of that species.

The timbers differentiate these trees in a marked degree. The timber of Sieber's *C. glauca* has the characteristic feature pertaining to our She Oak trees—the medullary rays being very conspicuous and pronounced, producing an elegant figure when the wood is cut on the quarter; whilst "Belah," *C. Cambagei*, possesses no figure whatever, and so in this respect shows no affinity with any of the other species of the genus. In fact, it was not till attention was drawn to this feature by Mr. Cambage that a new species was detected in this particular case. Bentham (B.Fl. Vol. vi. p. 196) under Sieber's *C. glauca* records that species (amongst other localities) as ranging "from the Lachlan and Darling Rivers to the Barrier Range." Now Sieber's type with the "Smaller cones and very numerous rather smaller valves very regularly arranged" was collected by him in the coast district of the Colony; it does not extend beyond the mountains, and it can be shown to be a distinct species from this one, so that Bentham, working on herbarium material, might easily be led to include the coast and interior trees as one and the same species, as there is some resemblance in the branchlets and perhaps in the cones of the two.

Sieber's *C. glauca* differs from this interior species in its "smaller cones, and its smaller and more regularly arranged valves"—which have not a dorsal thickening as holds in this species.

The nuts of the two species never could be confounded—those of *C. glauca* being very small, with a narrow samara, whilst those of this species are twice as long and have a broad samara. The male spikes of *C. glauca*, Sieb., are twice the length and have long revolute hair-like sheath-teeth in contradistinction to the short and erect ones of this species.

The valves of the fruits of this species are also quite distinct, those of *C. glauca* being of an uniform thickness; they are also quite distinct from those of *C. equisetifolia*, Forst.

The cones are allied to those of *C. stricta*, Ait., and it might here be stated that very possibly Bentham's synonymy under that species (B.Fl. Vol. vi. p. 195) will require, in face of our present knowledge, to be revised, as some of the species are quite worthy

of specific rank. It would appear now that Casuarinas, like Eucalypts, cannot always be determined satisfactorily on herbarium material alone.

In botanical sequence it is placed after *C. stricta*, Ait., as it has branchlets and sheath-teeth similar to that species and somewhat similar fruit.

Baron von Mueller in his Fragmenta (Vol. x. p. 115) describes a species of *Casuarina* under the name of *C. lepidophloia*, from imperfect material, and so it is rather difficult to know to what tree he refers. Through the kindness of Mr. J. G. Luehmann, F.L.S., Curator of the National Herbarium, Melbourne, I have been enabled to examine the specimens on which Mueller founded his species, and except in the diameter of the leaflets (in some cases) there is nothing to connect it with this new species. The bark of "Belah" is certainly not "flaky."

Mueller states (*loc. cit.*) that *C. lepidophloia* occurs amongst *C. glauca*, but this needs some explanation, as *C. glauca* is not found in the interior; perhaps it was this particular species that he referred to under *C. glauca*, Sieb. The timber of this tree is so characteristic that had Baron von Mueller intended his description to apply to this species he would have described or referred to so peculiar a wood. The valves are rarely "fulvous pubescent," but nearly always whitish.

This new species is also one of the largest trees of the interior.

Timber.—The most marked specific difference of "Belah" is, as stated above, in the character of its timber. *C. glauca*, Sieb., ("Swamp Oak") has the usual timber characteristics of "She Oaks," but this tree possesses a timber quite distinct from that of any other of the Natural Order. The medullary rays can only with difficulty be traced, and whilst all other *Casuarina* timbers split on the quarter, this timber splits more readily at right angles to the rays, and this is one of the timber-getter's tests for the species. When "dressed" it has very little figure, is of a yellowish colour, close-grained, hard, and, in fact, more resembles English Hornbeam than any other Australian timber that has

come under my notice. When placed amongst other Museum specimens of She Oaks, it shows little or no affinity with them. It is perhaps the hardest timber in the Western area of the Colony.

Fodder.—The branchlets are cut in considerable quantity for fodder (R. H. Cambage).

Casuarina Luehmanni, sp nov.—"Bull Oak."

(Plate xlvii.)

A fair-sized tree, attaining a height of 70 to 80 feet, or rarely 100 feet, and a diameter of from 1 to $1\frac{1}{2}$ feet, rarely 2 feet. Bark furrowed, brittle, and easily removed. Branchlets robust, light coloured or glaucous, under a line ($\frac{3}{4}$) in diameter, about the same thickness as in *C. glauca*, Sieb., the internodes ribbed, 6 lines long, glaucous, the nodes yellow, sheath-teeth brown or black, short, acute, 9 to 12 in the whorl, mostly 11.

Flowers dioecious. Male spikes about an inch long, of a light golden-brown colour, clustered at the nodes toward the end of the branchlets; internodes straw-coloured; teeth golden-coloured, erect, short, acuminate, constricted at the nodes.

Fruit cones flattened, about $\frac{1}{2}$ inch in diameter, and consisting almost uniformly of three discs or rows of valves, but often irregularly shaped, owing apparently to only a few of the seeds being developed. Valves protruding, prominent, sometimes pubescent at the back and front, with a well defined dorsal protuberance extending from the base of the valve to half its length and ending in an abrupt angle broadly obtuse or shortly acuminate. Nuts small, dark brown, shining, with a short samara.

Hab.—Forbes, Parkes, Condobolin *(R. H. Cambage)*, Grenfell, Bourke to Barringun.

The range is almost identical with that of "Belah," *C. Cambagei*.

Following Bentham's classification (B.Fl. Vol. vi. p. 194), this species belongs to the section Leiopitys—whorls 7-16-merous, and

of the species in this section it has greatest affinities with *C. glauca*, Sieb., and *C. lepidophloia*, F.v.M. The branchlets by their thickness and colour distinguish it from *C. stricta*, Ait., and other inland species. The fruits are so characteristic and constant throughout its extensive range that the species cannot easily be confounded with any other.

Timber.—A hard close-grained wood. The heart wood is of a deep red colour, toning off to pale towards the bark. Medullary rays very pronounced, especially in a transverse section (*vide* Mr. Cambage's remarks appended). Useful for cabinet and ornamental work.

To Mr. R. H. Cambage, L.S., Mining Surveyor of the Mines Department, is due the credit of having determined in the field the specific differences of these two trees from cognate species, particularly in regard to their timber characters, and he writes concerning them :—

'The "Belah" and "Bull Oak" are two Casuarinas growing in the western districts of N. S. Wales. Their general appearance is somewhat similar, but after a little practice they can be readily identified at a distance of quite a quarter of a mile in level country.

'The most striking difference is that the "Belah" has a darker and denser foliage than the "Bull Oak." The branchlets of the former are finer but more numerous, and this latter fact always gives one the impression that the "Belah" is a very healthy looking tree, while the foliage of the "Bull Oak" looks a little more sparse and of a lighter colour, that of the "Belah" being a dark green. The "Belah" is cut considerably for fodder, while the "Bull Oak" is little used for that purpose. On approaching the two trees it becomes manifest that the bark of the "Belah" is the smoother, while that of the "Bull Oak" is considerably furrowed and thicker. On cutting the trees it is found that the "Bull Oak" is a mass of medullary rays, some of which are $\frac{1}{8}$ of an inch across as seen on the top of a stump. I have noticed them

on old exposed stumps near Forbes on which the weathering has acted more upon the wood around the edge and between the rays than upon the rays themselves, the effect being that towards the edge of the stump the rays may be seen standing in relief like so many blades while the sap and wood between have disappeared.

'The "Belah" when cut down discloses practically no medullary rays, but some very fine ones may be seen in cross sections of the upper branches. My attention was first drawn to this matter some years ago when I noticed that my axemen in splitting Oak would split it, to use their own term, "on the quarter," that is along the line of the medullary rays, but in splitting "Belah" it would be "on the back," or at right angles to the rays. Knowing that this course was followed because it was easier, I looked for the cause and found that great assistance was obtained from the rays in the Oak, and but little from the very fine ones in the "Belah."

'*Habitat.*—The "Bull Oak" is generally found growing on fairly level land, but not necessarily a flat, while the "Belah" is usually considered as an indication of dampness, probably low land subject to water in wet weather, and known as "gilgai country" from the numerous natural water basins which bear that name. It is not usual to find the two trees growing alternately along any route that may be travelled, but the groups or belts may alternate, as, for instance, the "Bull Oak" may be followed for a few miles when it will, perhaps, cease and before it reoccurs one or more belts of "Belah" may be passed. In some cases the one group will continue right up to the other, so that in the distance of a few chains many trees of each may be noticed.'

I have to acknowledge my indebtedness to Mr. J. G. Luehmann, F.L.S., Curator, National Herbarium, Melbourne, for his assistance in the differentiation of these species by the loan of specimens.

EXPLANATION OF PLATES.

(Plate xlvi.)

"Belah"—*Casuarina Cambagei*, R.T.B.

Fig. 1.—Twig with branchlets with staminate spikes.
Fig. 2.—Sheathing-teeth of branchlet (enlarged).
Fig. 3.—Portion of branchlet showing stamens (enlarged).
Fig. 4.—Pistillate flowers.
Fig. 5.—Fruit cone.
Fig. 6.—Nut.

(Plate xlvii.)

"Bull Oak"—*C. Luehmanni*, R.T.B.

Fig. 1.—Twig with terminal branchlets and young cones.
Fig. 2.—Staminate spikes.
Fig. 3.—Sheathing-teeth of branchlet (enlarged).
Fig. 4.—Fruit cones.
Fig. 5.—Nut.